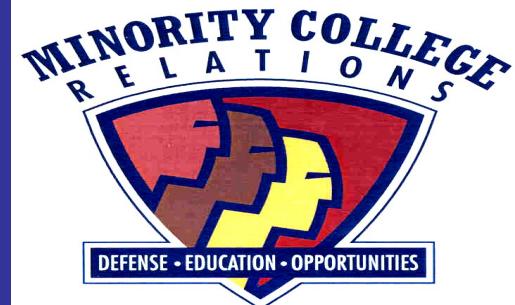


DEPARTMENT OF THE ARMY



"A Pathway to Federal Opportunities"

Females and Minorities in Engineering and the Sciences

Presented by: Linda Ann Riley Ph.D.
Associate Department Head
Department of Industrial Engineering
New Mexico State University

***Department of the Army - Minority College Relations
Program Workshop***



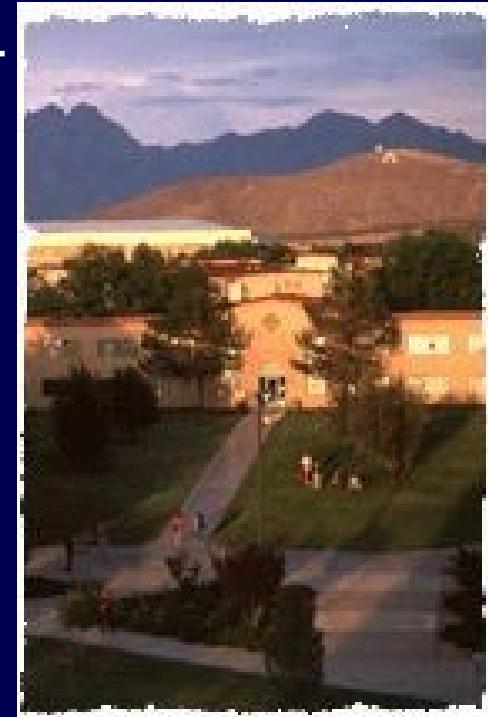


Overview of the Presentation

- Brief background of New Mexico State University and the College of Engineering
- Presentation of the challenge
 - Statistics
 - Consequences
 - Outlook
- How are we addressing the challenge?
- Opportunities for partnerships
- Discussion and questions

Background of New Mexico State University

- Established 1888, total headcount 15,224
- Degrees Offered, 74 Bachelors, 51 Masters, 22 Ph.Ds
- Carnegie Doctoral Research Extensive
- Hispanic Serving Institution
 - Overall undergraduate - 51% minority enrollment





Background of the College of Engineering

- College of Engineering - undergraduates - 54% minority enrollment, graduate level - 20% minority enrollment, 19% female enrollment at both the undergraduate and graduate levels although this percentage varies greatly by department at the undergraduate level.
- College of Engineering Faculty - 81 total, 75 male and 6 female, Race/Ethnicity - 10 Hispanic
- 2000-2001 COE Granted 97 Masters Degrees and 12 Doctorates



More on NMSU's Recognitions

- Top 15 schools nationally that are the baccalaureate origin of engineering doctorates for Hispanics
- Top 20 schools in the country with Hispanic graduate science and engineering enrollment
- I.E. Ph.Ds...on average for the past three years we have granted approximately 10% of all the I.E. Ph.Ds to women in the U.S.



So Why Should We be Concerned?

- NMSU is a majority minority institution - excellent programs in place to assure success of our students, targeted programs for retention
- Several NSF programs for recruitment of minority faculty and women specifically in science and engineering
- National status in engineering and science accomplishments of the university and our students

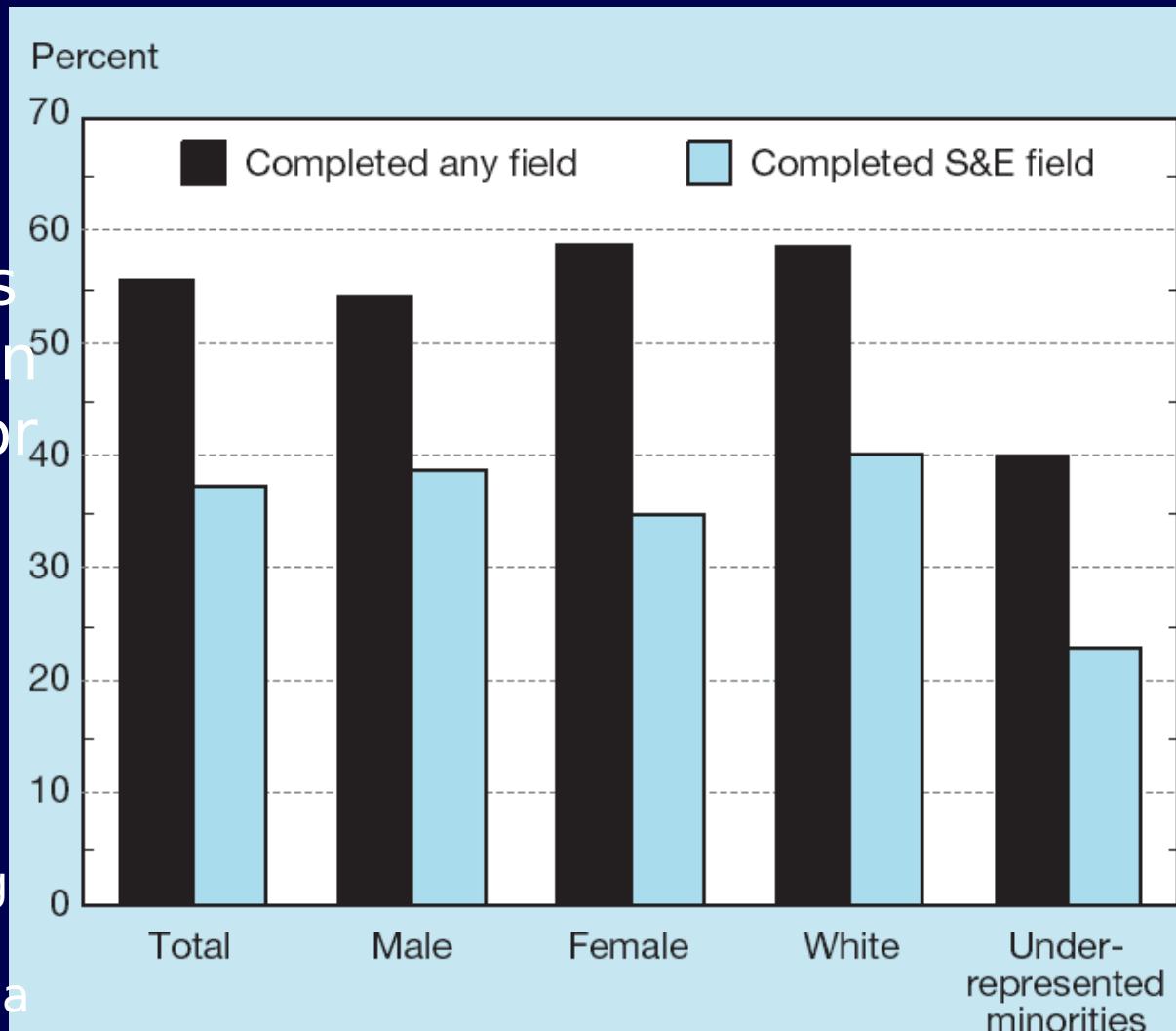


The Challenge for Colleges and Universities

- Overall, female and minority enrollment, (male and female), in engineering and science undergraduate and graduate programs is greatly disproportionate with general population statistics.
- Female and minority retention in S&E is lower than other groups.
- Shrinking number of U.S. citizens pursuing graduate and doctoral degrees in engineering and growth rate of females and minorities awarded graduate degrees is minimal.

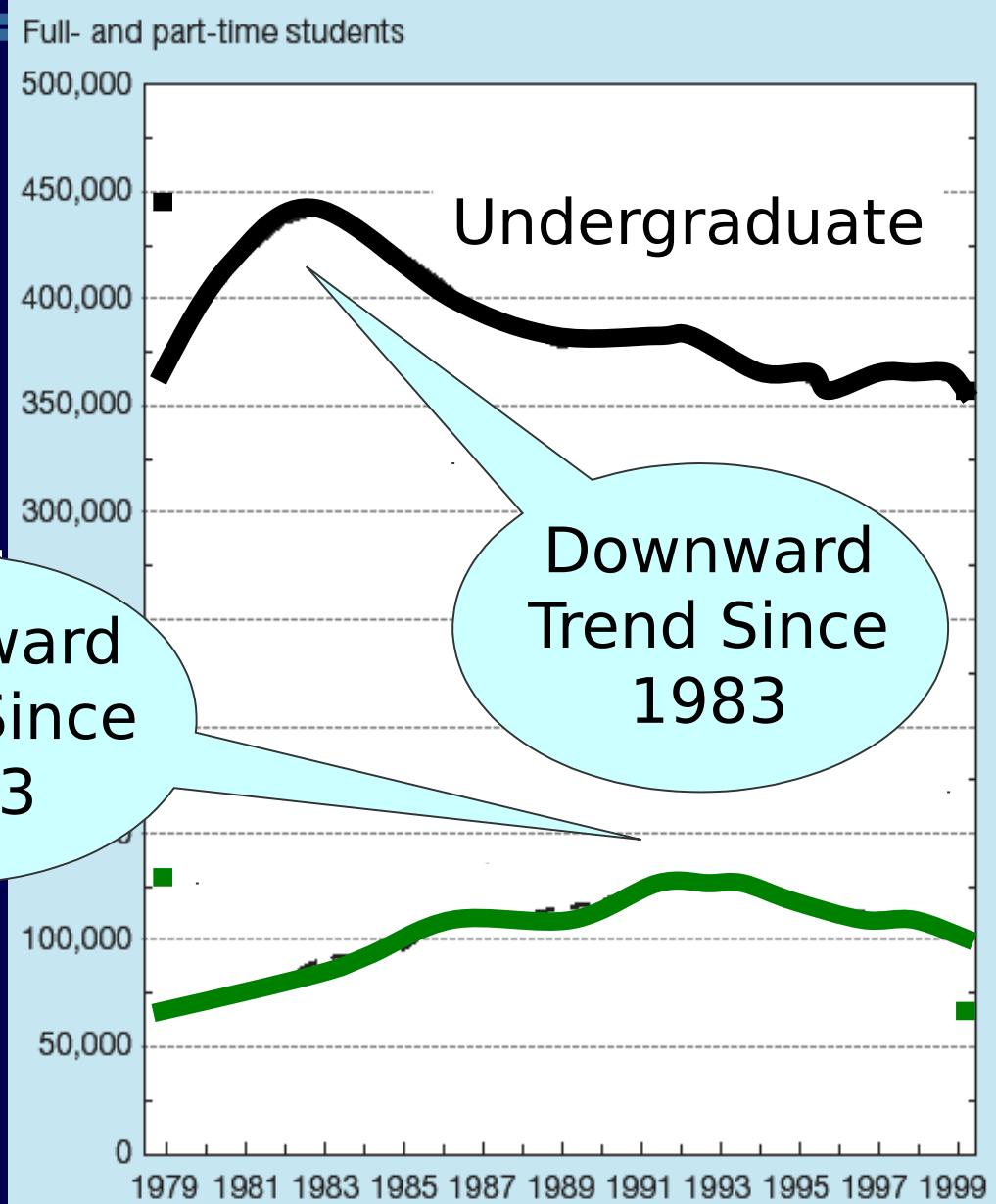
Graduation and Completion Rates Of 1992 Freshman Intending to Major In S&E Fields

Source:
Science & Engineering
Indicators - 2002
University of Oklahoma

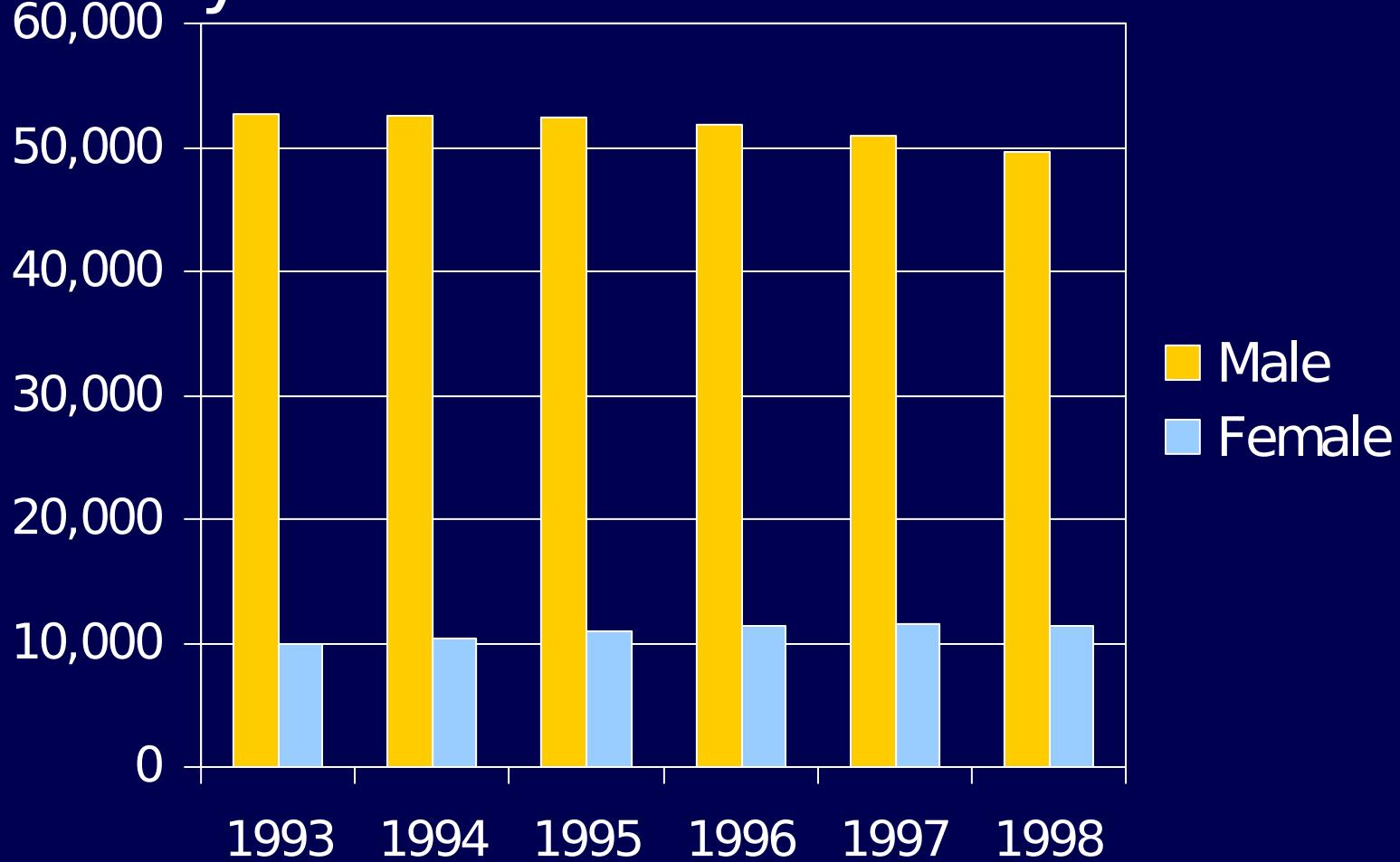


U.S. Engineering Enrollment by Level and by Year

Source:
Science & Engineering
Indicators - 2002



Bachelors Degrees in Engineering By Sex



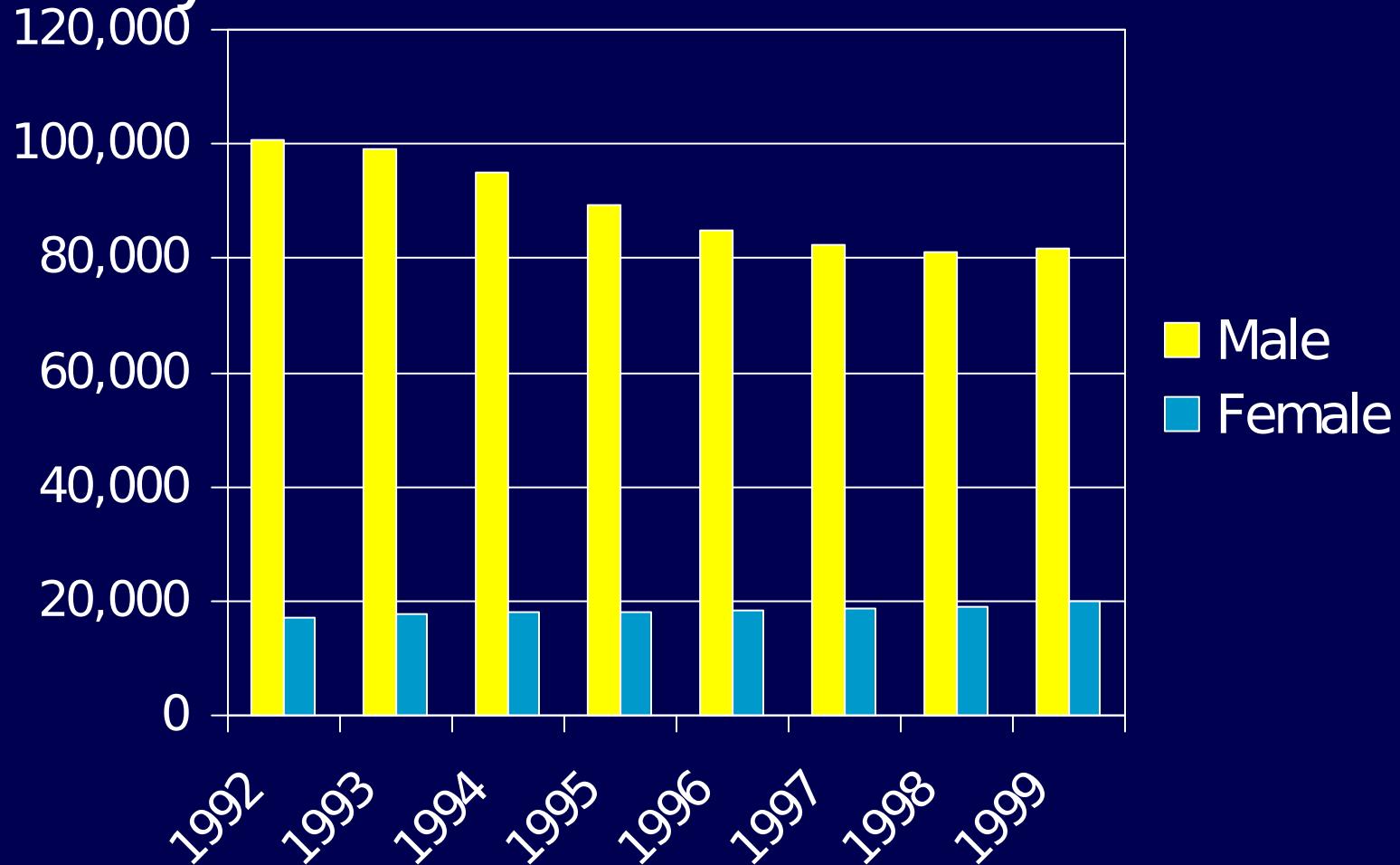
Source: Science & Engineering Indicators - 2002



Percentage of Engineering Bachelor's Degrees Earned by Women by Race/Ethnicity

- Source: National Science Foundation for 1996 recipients
- Total Female - 18.3%
- White, Non Hispanic - 16.3%
- Asian, Pacific Islander - 21.2%
- Black - 36.4%
- Hispanic - 22.8%
- American Indian, Alaska Native - 21.5%
- (To be read....Of all the Hispanic students receiving Bachelor's Degrees in Engineering, 22.8% were female.)

Graduate Enrollment in Engineering By Sex



Source: Science & Engineering Indicators - 2002



Breakdown of Graduate Students in Science and Engineering by Sex and Race/Ethnicity

	White	Asian	Black	Hispanic	American Indian	Unknown	Non-U.S.
Male	32.2	3.9	2	1.9	0.2	2.7	17.3
Female	23.7	2.5	2.7	1.8	0.2	1.9	6.9

Source: National Science Foundation, Survey of Graduate Students in Science and Engineering - 1997 Data

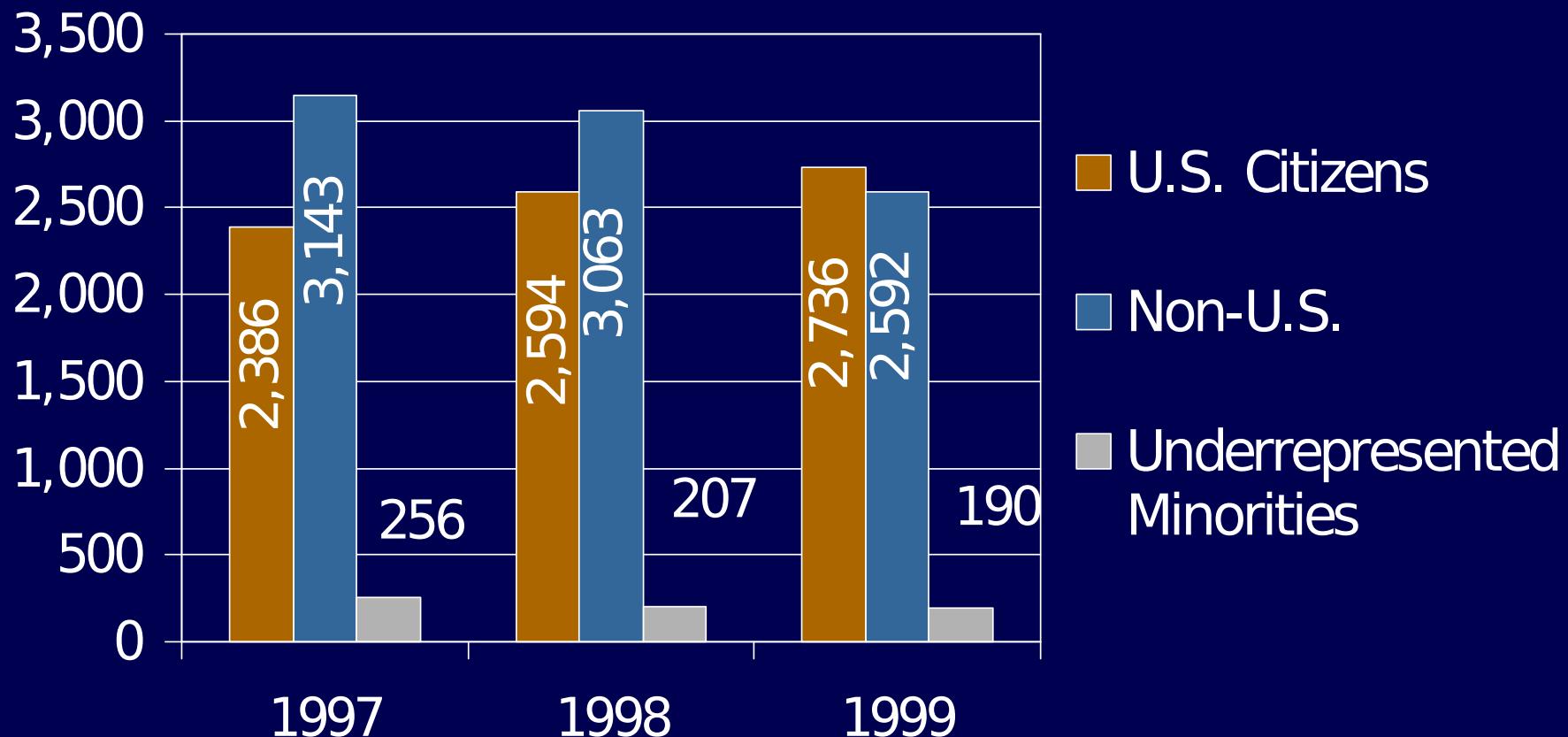


Breakdown of Graduate Students in Engineering by Sex and Race/Ethnicity

	White	Asian	Black	Hispanic	American Indian	Unknown	Non-U.S.
Male	37.4	6.3	1.9	2.1	0.2	3.6	29.9
Female	8.2	1.8	0.9	0.6	0.1	0.9	6.1

Source: National Science Foundation, Survey of Graduate Students in Science and Engineering - 1997 Data

Doctorates Awarded in Engineering



Source: Science & Engineering Indicators - 2002



Minority Female Doctorates Awarded in Engineering

- Black Women
 - 1995 - 15
 - 1996 - 19
 - 1997 - 23
- Hispanic Women
 - 1995 - 11
 - 1996 - 14
 - 1997 - 23

Source: Women, Minorities and Persons with Disabilities
in Science and Engineering 2000



What Has Caused These Trends?

- Lack of role models/mentors
- Lack of programs at graduate level to address retention issues
- Females/minorities report lack of identification with professors/administrators
- Females/minorities report lack of others like themselves (interests, cultures, backgrounds)
- Lack of societal value of engineers and scientists
 - Salary examples



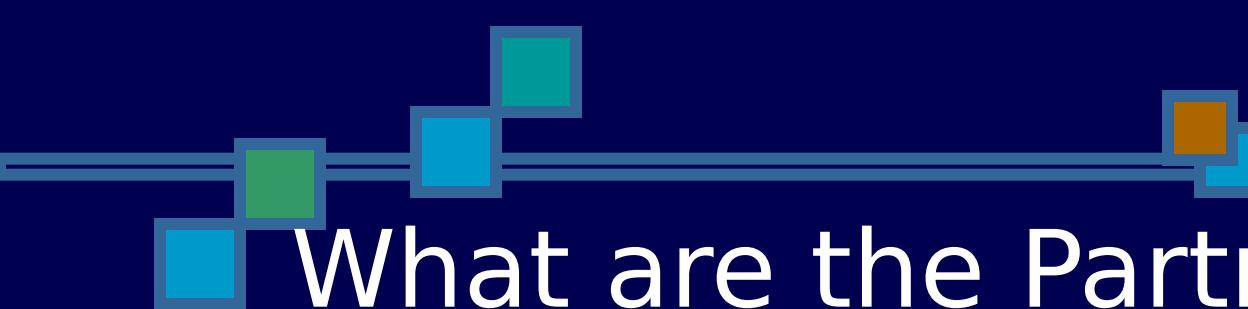
What are the Consequences?

- Without effective and immediate action the downward trends will continue.
- Significant loss of contribution by females and minorities in the composition of the national R&D base.
- Lost opportunities for new diverse perspectives and thinking in the educational and industrial sectors.



What is NMSU Doing About It?

- Some examples:
 - ADVANCE Institutional Transformation Program
 - Alliance for Minority Participation
 - NMSU Title V Program – Strengthening Hispanic Serving Institutions
 - AGEP – Alliance for Graduate Education and the Professoriate
 - Las Cruces Prep, BEST, Girls in Engineering, NASA Aerospace Experiences (K-12 programs)



What are the Partnering Opportunities?

- Additional graduate fellowships needed with focus on recruitment of women and minorities
- Internships and coops at Army facilities
- Faculty research opportunities are needed for involvement of women and minorities
- Long term partnerships with programs that support female and minority retention programs
- Sponsoring seminars and workshops at institutions such as NMSU to highlight national role models
- Mechanisms?



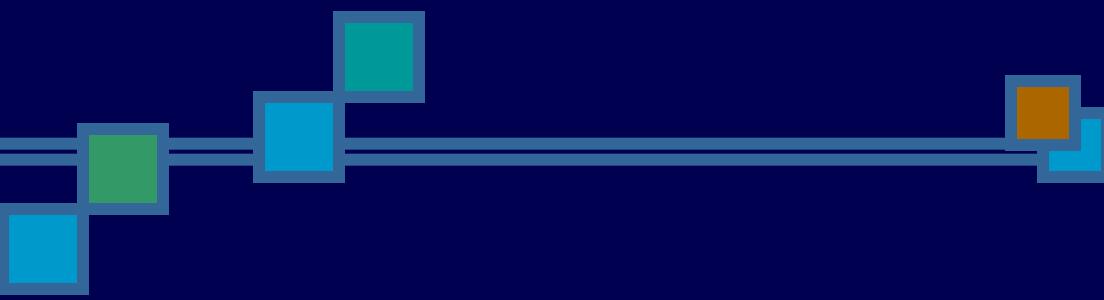
More Resources on the Trends:

<http://www.nsf.gov/sbe/srs/stats.htm>

National Science Foundation, Division of
Sciences Resources Statistics

Science And Engineering Indicators 2002

Women, Minorities and Persons with
Disabilities in Science and Engineering
2000



Questions?